

REMARKS/ARGUMENTS

Restriction Requirement

Applicants acknowledge the Examiner's withdrawal of claims 39-57 pursuant to Examiner's Restriction Requirement in the Office Action dated December 2, 2002, subject to the right of Applicants to present the claimed subject matter of claims 39-57 in a future Divisional Application.

Information Disclosure Statement

Applicants acknowledge the Examiner's statement regarding failure of compliance of website references in Applicant's Information Disclosure Statement.

Amendment of Title

The title of this application is shown as amended by Applicants' First Preliminary Amended dated October 31, 2001.

35 U.S.C. 112 Rejections:

Claim 58 reciting the limitation "inducing a sufficient number of errors" has been amended to more particularly point out the amount and style of errors meant to limit the claim.

Claim 1 reciting the same limitation has also been amended in the same manner.

Claims 66, 75 and 76 have been amended according to the Examiner's suggestion to more clearly claim the subject matter for which a protection is sought.

As claim 58 has been amended to correct deficiencies thereof, the remaining claims 59 to 95 depending on claim 58 are believed to be in conformity with 35 U.S.C. 112.

35 U.S.C. 102(e) Rejections:

The Examiner rejects claims 1 to 8, 32, 36, 37, 58 to 65, 89, 93 and 94 under 35 U.S.C. 102(e) as being anticipated by NAPIER. It is the Examiner's contention that NAPIER discloses that the more individual errors in a grating, the lower the average error of the grating. However, the Applicants respectfully submit that the Examiner is mistaken in his interpretation of NAPIER.

NAPIER does not disclose that the more individual errors in the grating, the lower the average error. NAPIER discloses that by using a first phase mask having some errors, by holographically producing a second mask using the first mask, the errors in the first mask are averaged out (or spread) in the second mask. The improved second mask can then be used for Fiber Bragg grating fabrication. As explained in column 6, lines 3 to 34, NAPIER's disclosure is based on the fact that the grating recorded in the fiber will have an improved periodicity compared with the phase mask from which it was made, because the holographic fringe formation smoothes the random line placement error. Each fringe recorded in the fiber grating is a result of a holographic process and includes contributions from many lines on the phase mask. The contribution from many phase mask lines causes an averaging of the line placement error.

As disclosed by NAPIER, the phase mask including the line placement errors is not used to write the Bragg grating in the optical fiber, but is instead used to manufacture a second phase mask. This second phase mask is written using holographic exposure of a photo-resist, which is then chemically etched and is used in a conventional manner to write the desired interference pattern into the photosensitive optical transmission medium.

Moreover, proximity of positioning errors is not discussed by NAPIER. The present claims recite a phase mask having more errors of the same size (RMS) closer together (smaller segment size). NAPIER discloses that a large error is averaged by holographic exposure whereas the present claims recite that many closely space large errors are averaged by themselves.

It is therefore contended that the subject matter recited in independent claims 1 and 58 of the present invention is distinguished over the method disclosed by NAPIER.

Consequently, referring to claim rejections under 35 U.S.C. 102, Applicants respectfully traverse these claim rejections and submit that claims 1 and 58 are not anticipated by NAPIER, and are therefore new and inventive in view of the cited prior art.

Regarding claims 2 and 59, referring to column 3, lines 9 to 13 of NAPIER, the Examiner contends that NAPIER discloses writing an additional number of segments than are required by a desired design. This contention is however respectfully traversed. NAPIER

does not disclose that an additional number of segments are written than are required initially. As explained above, NAPIER discloses that an improved second mask obtained from a first mask is used in a conventional manner to fabricate an interference pattern in an optical fiber. In column 3, lines 9 to 13, NAPIER teaches that a plurality of subsequent masks obtained from the first mask can be fabricated. Then, only the last manufactured mask is used to actually fabricate the grating.

Applicants therefore submit that claims 2 and 59 are not anticipated by NAPIER, and are therefore allowable.

Regarding claims 3 and 60, the Examiner states that Figure 7 of NAPIER shows that as the proximity of errors increases, the group delay decreases, therefore as the errors become infinitely close together, the group delay will inherently become zero.

Applicants respectfully traverse these rejections, since Figure 7 of NAPIER is a graph of the Group Delay Ripple as a function of the size of the error, not the proximity of the error. Consequently, Applicants submit that claims 3 and 60 are not anticipated by NAPIER and are therefore new and inventive.

As claims 4, 5, 6, 7 and 61, 62, 63, 64 all respectively include the limitations of allowable claims 1 or 58, as amended, they are also believed to be new and inventive and are therefore allowable in view of the cited prior art.

Regarding claims 8 and 65, the Examiner states that NAPIER discloses inducing a plurality of stitching errors into the pattern. However, Applicants respectfully traverse this rejection, since NAPIER discloses that the process induces many stitching errors. These errors are induced non-intentionally and are attributable to the limitation of the conventional writing systems only. In the present invention, many (or more) stitching errors are induced intentionally for reducing the average of these stitching errors.

It is consequently submitted that claims 8 and 65 are new and inventive and are therefore allowable in view of the cited prior art.

Regarding claims 32 and 89, the Examiner contends that NAPIER discloses writing a plurality of at least one geometrical shape. However, Applicants respectfully submit that reference to Figure 3 of NAPIER is irrelevant and that NAPIER does not disclose writing a plurality of at least one geometrical shape. Consequently, the Examiner is respectfully requested to withdraw his rejections of claims 32 and 89.

Regarding claims 36 and 93, the Applicant agrees with the Examiner. However, since these claims respectively include the limitations of claims 1 or 58, they are believed to be allowable in view of the cited prior art.

Regarding claims 37 and 94, the Examiner states that NAPIER discloses that as the proximity of the errors increases, the group delay ripple decreases. It is once again respectfully submitted that the Examiner has misinterpreted Figure 7 of NAPIER, because NAPIER teaches the size of the errors, not the proximity, whereas claims 37 and 94 recite the proximity of the errors. It is therefore respectfully submitted that claims 37 and 94 are allowable in view of the cited prior art.

35 U.S.C. 103 Rejections:

The Examiner has rejected claims 9, 10, 17 to 20, 66, 67 and 74 to 77 under 35 U.S.C. 103, as being unpatentable over NAPIER in view of CLEMENTS. Since these claims depend respectively either directly or indirectly from independent claims 1 or 58, and therefore include all of the limitations of the independent claim, and since Applicants believe that claims 1 and 58 are patentable for the reasons explained above, it is respectfully submitted that these claims are not obvious in view of the cited prior art.

Moreover, Applicants submit that the Examiner is mistaken in his interpretation of CLEMENTS.

It is the Examiner's contention that CLEMENTS teaches the use of having different periods in the grating by modifying the scaling factor. However, it is respectfully submitted that CLEMENTS does not change the period by adjusting a scaling factor. A scaling factor is a parameter in the manufacturing tool. The rule disclosed by CLEMENTS is a mathematical representation of the variation of the period, not a scaling factor.

The Examiner further states that the grating disclosed by NAPIER, having different periods for the purpose of using the grating to effect several different polarizations of the incident light, would have been obvious to a person of ordinary skill in the art at the time the invention was made. There is no mention of polarization in CLEMENTS. Respectfully, it seems to the Applicants that the Examiner mistook polarization and wavelength.

It is consequently respectfully submitted that claims 9 and 66 are new and inventive and are therefore allowable in view of the cited prior art.

Regarding claims 10 and 67, according to the arguments presented above, it is respectfully submitted that these claims are new and inventive and the Examiner is respectfully requested to withdraw his rejection.

Regarding claims 17 to 20 and 74 to 77, the Examiner states that it would have been obvious to a person of ordinary skill in the art at the time the invention was made, to have a grating having sub-segments with a variety of characteristics as taught by CLEMENTS for the purpose of increasing the applicability of the invention and to induce more errors which could decrease the group delay ripple. However, CLEMENTS does not teach sub-segments. The lines of the segments of Figure 2 of CLEMENTS, as disclosed in column 4, lines 1 to 44 of CLEMENTS, are not the sub-segments as defined in the present invention.

It is therefore respectfully submitted that claims 17 to 20 and 74 to 77 are allowable in view of the cited prior art.

The Examiner rejects claims 11 to 16, 21 to 26, 34, 35, 68 to 73, 78 to 83, 91 and 92 under 35 U.S.C. 103, as being unpatentable over NAPIER in view of LEE.

Since these claims respectively depend directly or indirectly from independent claim 1 or 58, and accordingly include all of the limitations of these independent claims, and since Applicants believe that claims 1 and 58 are allowable for the reasons given above, it is respectfully submitted that these claims are not obvious in view of the cited prior art.

Moreover, Applicants respectfully submit that the Examiner is mistaken in his interpretation of LEE. LEE does not teach or suggest the same pixel as the pixel recited in

the present claims. The pixel location of the present invention is the writing grid of the writing machine, which is a few nanometers (nm). The pixels disclosed by LEE are areas of few micrometers (μm) defined by the designer with no reference to the real pixels of the manufacturing machine. The Examiner particularly refers to column 5, lines 13-14 to reject these claims. However, LEE does not teach or suggest a periodic grid of 10 nm, but rather 10 μm (micrometers), which is 1000 times larger.

Therefore, it is respectfully submitted that claims 11 to 16, 21 to 26, 34, 35, 68 to 73, 78 to 83, 91 and 92 are new and inventive in view of the cited prior art, and the Examiner is respectfully requested to withdraw his rejections of these claims.

The Examiner rejects claims 27 to 31, 33, 84 to 88 and 90 under 35 U.S.C. 103 as being unpatentable over NAPIER in view of KURIHARA. Applicants agree with arguments presented by the Examiner. However, since these rejected claims respectively depend from independent claim 1 or 58, and consequently include the limitations of claim 1 or 58, they are believed to be allowable in view of the cited prior art. Accordingly, the Examiner is respectfully requested to withdraw his rejections of these claims.

The Examiner has rejected claims 30 and 87, stating that NAPIER teaches repeating the writing step for multiple exposures. The Examiner further states that the use of two masks inherently means that writing step must be repeated for multiple exposures. However, the multiple exposures recited in claims 30 and 87 mean exposing many times the same position of the same phase mask. The use of two masks by NAPIER is a totally different concept. A first mask is exposed and a second mask is exposed (once) by using the first mask.

Therefore, Applicants respectfully submit that claims 30 and 87 are new and inventive and are consequently allowable in view of the cited prior art.

Finally, the Examiner has rejected claims 38 and 95 as being unpatentable over NAPIER in view of STARODUBOV. However, since these claims both include the limitations of allowable claim 1 or 58 respectively, they are believed to be allowable in view of the cited prior art.

Conclusion

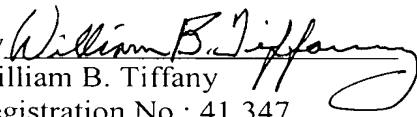
Claims 1-95 were originally pending in the Application. Claims 39-57 were withdrawn from consideration pursuant to the Examiner's Restriction Requirement. Claims 1-38 and 58-95 were rejected by the Examiner. Applicants have herein amended claims 1, 58, 66, and 75-76. Claims 1-38 and 58-95, as herein amended, are presently pending in the application.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes \$110.00 extension fee is due with this response, and a check in that amount is enclosed. If any additional fees are due during the pendency of this application, please charge our Deposit Account No. 06-2380, under Order No. 64626/P001CP1/10302976 from which the undersigned is authorized to draw.

Dated: August 4, 2003

Respectfully submitted,

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